CLAIMS

1. Polypeptide which possesses an activity of the β-secretase type, characterized in that it is able to cleave the natural precursor (APP) of the β-amyloid peptide specifically.

2. Polypeptide according to claim 1, characterized in that the β-amyloid peptide precursor (APP) does not carry any mutation in its protein sequence.

3. Polypeptide according to claim 1 or 2, characterized in that it is a polypeptide which has been purified from human cells from an individual who is not suffering from Alzheimer's disease.

4. Polypeptide according to one of claims 1 to 3, characterized in that it:

- possesses a molecular mass of about 70 kDa
- possesses an isoelectric point of about 6.0
- is an endopeptidase of the serine protease family
- is an endopeptidase of the chymotrypsin-sensitive type
- achieves a maximum activity at a pH of between 7 and 8.

5. Polypeptide according to claim 4, characterized in that its activity does not depend on a second substrate and/or ligand.

6. Polypeptide according to claim 5, characterized in that its activity does not depend on ions, preferably calcium or magnesium cations.

7. Non-peptide compound, or compound which is not exclusively peptide in nature, which compound is able to cleave the β-amyloid peptide precursor at the β-secretase site and is obtained by duplicating the active

motifs of the polypeptide according to claims 1 to 6 with non-peptide structures or structures which are not exclusively peptide in nature.

8. Polypeptide according to one of claims 1 to 7, characterized in that it additionally comprises a signal sequence.

9. Polypeptide according to claim 8, characterized in that the signal sequence is selected from the sequence of the signal peptide of IgkB, the signal peptide of APP and the signal peptides of the subunits of the muscle and central nervous system nicotinic acetylcholine receptors.

10. Process for purifying, from cells derived from individuals who are not suffering from Alzheimer's disease, a polypeptide according to one of claims 1 to 9, characterized in that the following steps are carried out:

- the supernatant from the cell culture is removed and then concentrated

- the concentration product is once again concentrated on a tangential membrane

- the resulting product is then purified by means of consecutive steps of chromatography, in particular by means of steps of exclusion chromatography, ion exchange chromatography and hydrophobic interaction chromatography.

11. Use of a human cell line, which represents the central or peripheral nervous system and the immune system and which is able to carry out the normal metabolism of the β-amyloid peptide precursor, for producing the polypeptides of the invention which are defined in accordance with claims 1 to 9.

The cell line selected is preferably the monocyte-derived THP1 cell line (ATCC TIB 202).

12. Use of a human cell line, which represents the central or peripheral nervous system and the immune system and which is able to carry out the normal metabolism of the β-amyloid peptide precursor, for detecting compounds capable of inhibiting the interaction between the polypeptide according to claims 1 to 9 and its substrate. The cell line selected is preferably the monocyte-derived THP1 cell line (ATCC TIB 202).

13. Antibody or antibody fragment, characterized in that it is directed against a polypeptide according to one of claims 1 to 9, and in that it possesses the ability to at least partially inhibit the interaction between the said polypeptide and the β-amyloid peptide precursor and/or inhibit the activity of the polypeptide as defined according to claim 1 and/or intervene in the metabolism of the β-amyloid peptide.

14. Process for detecting or isolating compounds which are able to at least partially inhibit the interaction of the polypeptide according to one of claims 1 to 9 and the β-amyloid peptide precursor and/or inhibit the activity of the said polypeptide, characterized in that the following steps are carried out:

a - a molecule or a mixture containing different molecules, which may not have been identified, is brought into contact with a recombinant cell which is expressing a polypeptide as defined according to one of claims 1 to 9 under conditions which would enable the said polypeptide and the said molecule to interact if the latter possessed an affinity for the said polypeptide, and

b - the molecules which are bound to the said polypeptide are detected and/or isolated.

15. Ligand for a polypeptide as defined according to claims 1 to 9, which can be obtained according to the process of claim 14.

16. Ligand according to claim 15, characterized in that it is an antagonist, an agonist or an inhibitor of the polypeptide defined according to claims 1 to 9.

17. Pharmaceutical composition which comprises, as the active principle, at least one inhibitor of the polypeptide according to one of claims 1 to 9.

18. Pharmaceutical composition which comprises, as the active principle, at least one antibody or antibody fragment according to claim 13 and/or one ligand according to claim 15.

19. Pharmaceutical compositions in which the peptides, antibodies or antibody fragment according to claim 13, and ligands and/or corresponding nucleotide sequences defined according to claim 15 are combined with each other or with other active principles.

20. Composition according to one of claims 17 to 19 which is intended for at least partially inhibiting the interaction between the polypeptide and the β-amyloid peptide precursor and/or inhibiting the activity of the polypeptide.

21. Composition according to one of claims 17 to 20 which is intended for intervening in the metabolism of the β-amyloid peptide and, preferably, for inhibiting or retarding production of the β-amyloid peptide.

22. Composition according to one of claims 17 to 21 which is intended for treating neurodegenerative diseases.

23. Composition according to claim 22 which is intended for treating Alzheimer's disease.

24. Use of an antibody or antibody fragment according to claim 13 and/or a ligand according to claim 15 for at least partially inhibiting the interaction between the polypeptide and the β-amyloid peptide precursor and/or inhibiting the activity of the polypeptide and/or intervening in the metabolism of the β-amyloid peptide.

25. Use of an antibody or antibody fragment according to claim 13 and/or a ligand according to claim 15, as a medicinal product, especially for treating neurodegenerative diseases and in particular Alzheimer's disease.

26. Use of the polypeptides according to claims 1 to 9 for preparing a medicament intended for treating neurodegenerative diseases, in particular Alzheimer's disease.

27. Use of the polypeptides according to claims 1 to 9 for detecting ligands of the polypeptides and/or compounds which are able to at least partially inhibit the interaction between the polypeptide and the β-amyloid peptide precursor and/or inhibit the activity of the polypeptide and/or intervene in the metabolism of the β-amyloid peptide.

28. Method for detecting molecules which modify the activity of the polypeptides of the invention, which method comprises the following steps:

- the polypeptides of the invention which exhibits an activity of the β-secretase type are brought into contact with a molecule or a mixture which contains different molecules, which may not have been identified,

- the reaction mixture described in the preceding step is brought into contact with the subtrate of the polypeptides of the invention, which substrate is preferably APP in its natural form

- the β-secretase activity on the APP is measured

- the molecules which modify the β-secretase activity of the polypeptides of the invention are detected and/or isolated.

29. Viral or plasmid vector which contains the nucleotide sequences of the molecules which are agonists or antagonists of the polypeptides of the invention, for transfecting the said sequences into appropriate host cells and expressing the said molecules which are agonists or antagonists of the polypeptides of the invention in vivo, ex-vivo and/or in vitro.